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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is also included. (AG)

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TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

INTERCOM SERVICEMAN (any ind.) 5-83.418

B-459 or B-189

TM 002 062

U. S. Employment Service in
Cooperation with
New York State Employment Service

November 1962

GATB #2315
July 1960

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY FOR INTERCOM SERVICEMAN (any ind.) 5-83.418

B-459 or S-189

Summary

The General Aptitude Test Battery, B-1002A, was administered to a total sample of 53 males employed as Intercom Serviceman, 5-83.418 by the Executone Corporation in New York, New York. The criterion was of the rank-comparison type. On the basis of mean scores, standard deviations, correlations with criterion, job analysis data, and their combined selective efficiency, Aptitudes V-Verbal, S-Spatial, and F-Finger Dexterity were selected for inclusion in the test norms.

GATB Norms for Intercom Serviceman - B-459 or S-189

Table I shows, for B-1001 and B-1002, the minimum acceptable score for each aptitude included in the test norms for Intercom Serviceman 5-83.418.

TABLE I

Minimum Acceptable Scores on B-1001 and B-1002 for B-459 or S-189

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
V	CB-1-J	80	V	Part 4	80
S	CB-1-F CB-1-H	105	S	Part 3	100
F	CB-1-O CB-1-P	80	F	Part 11 Part 12	75

Effectiveness of Norms

The data in Table V indicate that 11 of the 17 poor workers, or 65 percent of them, did not achieve the minimum scores established as cutting scores on the recommended test norms. This shows that 65 percent of the poor workers would not have been hired if the recommended test norms had been used in the selection process. Moreover, 28 of the 34 workers who made qualifying test scores, or 82 percent, were good workers.

I. Problem

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the occupation of Intercom Serviceman, 5-83.418.

II. Sample

The General Aptitude Test Battery, B-1002A, was administered during the period February 4, 1956 to April 17, 1957 to a sample of 72 males employed as Intercom Serviceman, 5-83.418 by the Executone Corporation in New York, New York and Jersey City, New Jersey. Of the total of 72 persons tested, criterion data were unavailable on 7; 4 were eliminated because their schooling was in spanish and 1 because of insufficient schooling; 7 were eliminated for incompleteness of tests. The final sample consisted of 53 males.

Table II shows the means, standard deviations, ranges, and Pearson product-moment correlations with the criterion for age, education and experience.

TABLE II

Means (M), Standard Deviations (σ), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education and Experience

INTERCOM SERVICEMAN, 5-83.418

N = 53

	M	σ	Range	r
Age (years)	33.3	9.1	19-70	-.059
Education (years)	11.7	1.9	7-16	-.063
Experience (months)	62.1	36.9	17-138	.206

There are no significant correlations between the criterion and these variables. The data in Table II indicate that this sample is suitable for test development purposes with respect to age, education, and experience.

III. Job Description

Job Title: Intercom Serviceman, 5-83.418

Job Summary.--Mounts in place and connects with wires the units of complete intercommunication "package" systems, following printed, illustrated installation instructions pertaining to the specific system ordered; test-tries installation and releases it ready for operation. Services and repairs installed "package" intercommunication systems; studies the records of the system if necessary; on location determines the nature of the complaint, diagnoses the cause and corrects it as promptly as possible to return it to operation; makes a record of the nature of the difficulty and of steps taken to correct it.

Work Performed.--Determines the nature of customer's complaint; inquires tactfully about nature of problem and notes supporting symptoms and evidence gained from his inquiry.

Makes a preliminary diagnosis of the probable cause and its probable location, and corrects it; uncovers suspected element and makes rapid corrections if diagnosis is correct, such as replacing burned-out tubes, tightening loose connections, cleaning dirty connections, adjusting the length of spring under talk-listen switches, etc., using fingers and/or small hand tools. Reduces static in system by applying chemical with small brush.

Conducts more painstaking systematic check to isolate and correct defect if it perists: e.g.,

Talking-Listening Unit: Checks various parts with ohmeter, noting if dial indicator is in prescribed limits. Checks for wrong connections, using hook-up chart as guide.

Power Supply Box (which provides constant supply of low voltage): Checks resistances, voltage and magnitude of current with appropriate meters.

Junction Boxes: Checks to see that wires are connected at right points, using hook-up chart as guide. Switches connections if necessary.

Connecting Wires and Cables: Checks wires with ohmeter, if necessary and possible; uses spare wire in cable to replace defective wire. Requisitions replacement of cable if there are too many breaks of short-circuits.

As a last resort, conducts a circuit-by-circuit analysis of the entire system.

Tries out corrected system: signals, talks and listens to and between elements involved in complaint and others if necessary, noting whether sound is adequate, hum-and static-free. Makes further adjustments if necessary. Requests complainant to try out system and approve adjusted performance.

Fills out report detailing time spent on job, replacements and adjustments made. Secures signature of customer; fills out service card on bottom of intercom unit, showing data and nature of service.

Experimental Battery

All the tests of the GATB, B-1002A, were administered to the sample group.

Criterion

The criterion for this study consisted of various sets of rank order ratings made by the Director of Technical Information and his assistant; these rankings were consolidated and converted to linear scores for the 53 people included in the sample.

Statistical and Qualitative Analysis

A. Statistical Analysis:

Table III shows the means, standard deviations, and Pearson product-moment correlations with the criterion for the aptitudes of the GATB. The means and standard deviations of the aptitudes are comparable to general population norms with a mean of 100 and a standard deviation of 20.

TABLE III

Means (M), Standard Deviations (σ), and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB

Intercom Serviceman, 5-83.418

N = 53

Aptitudes	M	σ	r
G-Intelligence	107.8	14.1	.316*
V-Verbal Aptitude	102.5	14.3	.313*
N-Numerical Aptitude	103.9	15.0	.170
S-Spatial Aptitude	110.5	16.0	.211
P-Form Perception	99.8	14.4	-.015
Q-Clerical Perception	102.4	12.7	.167
K-Motor Coordination	94.0	16.7	-.037
F-Finger Dexterity	101.6	19.3	.350*
M-Manual Dexterity	109.8	20.4	.117

*Significant at the .05 level

The highest mean scores in descending order of magnitude were obtained for Aptitudes S, M and G, respectively. Aptitudes G, V, P and Q have relatively low standard deviations.

For a sample of 53 cases, correlations of .351 and .271 are significant at the .01 level and the .05 level of confidence, respectively. Aptitudes G, V and F correlate significantly with the criterion at the .05 level.

B. Qualitative Analysis:

The statistical results were interpreted in the light of the job analysis data. The job analysis indicated that the following aptitudes measured by the GATB appear to be important for this occupation.

Intelligence (G) - required for exercising and applying judgment in diagnosing troubles in systems and determining nature of repair necessary.

Spatial (S) - required for visualizing and understanding the intercom system layouts.

Form Perception (P) - required for inspection of equipment, scale reading, and selection of proper parts.

Finger Dexterity (F) - required for rapid handling of small parts; for simple, rapid adjustments in units of intercom systems and in mounting of systems.

Manual Dexterity (M) - required for adjusting and mounting intercom system layouts.

C. Selection of Test Norms:

TABLE IV

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data Important Irrelevant	X			X	X			X	X
Relatively High Mean	X			X					X
Relatively Low Sigma	X	X			X	X			
Significant Correlation with Criterion	X	X						X	
Aptitudes to be Considered for Trial Norms	G	V		S	P			F	M

Various combinations of Aptitudes G, V, S, P, F & M with appropriate cutting scores were selected as trial norms. The relationship between each set of trial norms and the criterion for Intercom Serviceman 5-83.418 was determined.

A comparison of the results showed that norms consisting of V-80, S-100, and F-75 for B-1002 and equivalent norms of V-80, S-105 and and F-80 for B-1001 had the best selective efficiency.

VII. Concurrent Validity of Norms

For the purpose of computing the tetrachoric correlation coefficient between the test norms and the criterion and applying the Chi Square tests, the criterion was dichotomized by placing as close as possible to one-third of of the sample in the low criterion group (critical criterion score = 42). This resulted in 17 of the 53 workers, or 32 percent of the sample, being placed in the low criterion group.

Table IV shows the relationship between test norms consisting of Aptitudes V, S and F with critical scores of 80, 100 and 75, respectively, and the dichotomized criterion for Intercom Serviceman. Workers in the high criterion group have been designated as "good workers" and those in the low criterion group as "poor workers."

TABLE IV

Validity of Test Norms for Intercom Serviceman 5-83.418
(V-80, S-100 and F-75)

N = 53

	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	8	28	36
Poor Workers	11	6	17
Total	19	34	53

$r_{tet} = .63$ $\quad X^2 = 7.309$

$\sigma r_{tet} = .23$ $\quad P/2 < .005$

The data in the above table indicate a significant relationship between the test norms and the criterion for the sample.

VIII. Conclusions

On the basis of mean scores, correlations with the criterion, job analysis data, and their combined selective efficiency, Aptitudes V, S and F with minimum scores of 80, 100 and 75, respectively, are recommended as B-1002 for the occupation of Intercom Serviceman, 5-83.418. The equivalent B-1001 norms consist of V-80, S-105 and F-80.

IX. Determination of Occupational Aptitude Pattern

The specific norms established for this study did not meet the requirements for allocation to any of the existing 35 occupational aptitude patterns (10/61). The data for this sample will be considered for future groupings of occupations in the development of new occupational aptitude patterns.